DEPARTMENT OF THE NAVY
NORTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
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IN REPLY REFER TO

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Mr. Jeff McCullough
New York State Department of Environmental Conservation
Division of Environmental Remediation
50 Wolf Road
Room 208
Albany, New York 12233-7010

SUBJ: REQUEST TO RESTART AIR SPARGING/SOIL VAPOR EXTRACTION SYSTEM AT SITE 2 - FIRE TRAINING AREA; NWIRP CALVERTON, NEW YORK

Dear Mr. McCullough:

Over the past two years, the Navy has been conducting a pilot study to evaluate the effectiveness of using air sparging (AS) in conjunction with soil vapor extraction (SVE) as techniques for remediating volatile organic contamination in the soils and groundwater at the Navy's Installation Restoration (IR) Site 2 - Fire Training Area located on NWIRP Calverton.

The general conclusion has been that the AS/SVE system is an effective tool in reducing the amount of VOCs in both the soil and groundwater. Data supporting this conclusion has been previously forwarded to you and can be found in Final Reports of Results dated June 1996 as well as December 1996.

The Navy is planning on pursuing an overall evaluation of the AS/SVE technology in an upcoming Corrective Measures Study for Site 2, and with proper concurrence from your Agency, develop a decision document to install a "full scale" AS/SVE system as a final corrective measure for the site. Data gathered as part of the current Phase 2 RCRA Facility Investigation (RFI) will be used to better place injection and extraction wells associated with the AS/SVE system to maximize its location and efficiency.

However, since it is anticipated that the process described above will take several months to complete, the Navy would like to restart the pilot-scale AS/SVE system so that remediation of the site can continue while the required documentation can be prepared.

To this end, the Navy has enclosed a Letter Report developed by our environmental consultant, C.F. Braun Corporation, which describes air quality issues relative to the restart of the AS/SVE system. The Navy is requesting approval from NYSDEC to restart the AS/SVE system without the use of vapor-phase carbon since the air quality of the influent ambient air does not seem to warrant its use. By granting this approval, the Navy would be able to continue operation of the AS/SVE system for a longer period of time, thus increasing the overall remediation of this site.

I look forward to hearing from you soon regarding this matter. If you need additional information or would like to discuss this issue further, please give me a call at (610) 595-0567, extension 163.

Sincerely,

JAMES L. COLTER
Remedial Project Manager
By direction of the
Commanding Officer

Enclosure

Copy to:
U.S. EPA Region II, Carol Stein
SCDHS, Jim Pim

Request to Re-Start the Air Sparge/Soil Vapor Extraction System at the Site 2 - Fire Training Area NWIRP, Calverton New York

1.0 Background

Several sites at the NWIRP Calverton are being investigated under the Navy's Installation Restoration Program. As part of this work, a pilot-scale air sparge/soil vapor extraction (AS/SVE) system was installed at the Site 2 - Fire Training Area in the summer of 1995 and then operated for 3.5 months. The pilot-scale system was again started in May 1996 and operated as scheduled through September 1996. In September 1996, the system was shut down and winterized. The results of the study were presented in the Phase 2 Air Sparging/Soil Vapor Extraction Pilot Study, dated January 1997.

During this pilot study, soil, groundwater, and offgas samples were collected and analyzed for organic compounds. In addition, the thickness of the floating free product layer in several monitoring wells at this site was recorded. As a result of the system operation, the concentration of VOCs in soils, groundwater, and the offgas was estimated to decrease by approximately 90%. These results provide an indication that site cleanup was proceeding reasonably well; however that cleanup in the area tested was not yet complete. This is also evidence that the concentration of other organics, including petroleum hydrocarbons and semi-volatile organics (PAHs) was also being reduced. However, the reduction of these other organics was not as consistent as for the VOCs. One recommendation from the pilot study was to restart the system in a timely manner, to allow chemical volatilization and aerobic biodegradation to continue at the site

To re-start the system, the system operation requirements were evaluated. This evaluation indicated that vapor phase carbon (used during 1995 and 1996 operations) and analytical testing are the two primary cost elements. Currently, two rounds of groundwater testing at Site 2 are planned under the Phase 2 RFI, (which is in progress). As a result, the primary focus of this letter is to determine whether the AS/SVE system can be re-started in accordance with the NYSDEC Air Guide 1, without the use of vapor phase carbon on the system offgas.

2.0 NYSDEC Air Guide - 1

The NYSDEC Air Guide-1 (Draft) - Ambient Air Quality Impact Screening Analysis dated 1991, with an updated Appendix B (dated October 1995), was used to determine if there would be potential risks to human health resulting from the operation of the AS/SVE system without the use of vapor phase carbon on the offgas. Table 1 presents a listing of all chemicals detected in the soil vapor system offgas (prior to carbon treatment) during the 1995 and 1996 operations. Other information presented in this table include the CAS numbers, the measured offgas concentrations from 1996 operations, the calculated offgas loadings in pounds per hour (lb/hr) and pounds per year (lb/yr) (prior to vapor phase carbon), the NYSDEC Hazard Ratings, the NYSDEC Short-term and Annual Concentration Guidelines.

One important note with this data is that several of the chemicals were detected in the 1995 operations, but were not detected in 1996 operations including vinyl chloride, 1,1-dichloroethene, and benzene. Based on the 1996 operating data, these A-Hazard Rating chemicals would not be expected to be in the offgas during the 1997 operation.

The first step in determining compliance with the Air Guide-1 guidelines is to estimate the chemical specific emission rates. To do this, it is assumed that the future chemical specific off gas emission rate would be the same as that observed during the 1996 operations. Based on historic trend of VOC concentrations decreasing with time, this assumption would overstate potential risks from future operations.

Dispersion modeling was then conducted in accordance with the most conservative model presented in the 1995 Update to Appendix B using the standard point source method - which predicts impacts at the point of maximum concentration. The supporting calculations for this evaluation are attached, and predict that there should not be a exceedance of Air Guide-1 guidelines on either an Annual or a Short-term basis. The detailed chemical-specific comparison is presented in Table 2.

3.0 Conclusion

Based on this evaluation there is no need for air pollution controls on the offgas for the re-start and seasonal operation of the Air Sparge/Soil Vapor Extraction System at Site 2 - Fire Training Area - NWIRP Calverton, New York.

TABLE 1
ESTIMATED OFFGAS CONCENTRATIONS/LOADINGS
AIR SPARGING/SOIL VAPOR EXTRACTION PILOT STUDY
NWIRP CALVERTON, NEW YORK

Parameter	CAS Number	Method Detection Limit	Measured 1996 Offgas Concen. (ug/m^3)	Offgas Loading (lb/hr)	Offgas Loading (lb/yr)	NYSDEC Hazard Rating	NYSDEC Shortterm Guildlines (ug/m^3)	NYSDEC Annual Guildlines (ug/m^3)
Vinyl Chlonde	00075-01-4	0 6	0 6	450E-9	0.004	A	1,300	0 02
Chloroethane	00075-00-3	0.6	20 3	15E-6	0.134	C	630,000	63,000
Chloromethane	00074-87-3	0 6	0 6	452E-9	0 004	B	22,000	770
Acetone	00067-64-1	2 0	2 0	2E-6	0.013	C	140,000	14,000
2-Butanone	00078-93-3	2.0	2.0	2E-6	0 013	C	140,000	300
Carbon Disulfide	00075-15-0	2 0	2 0	2E-6	0.013	B	710	7
Methylene Chlonde	00075-09-2	1 9	4.4	3E-6	0 029	B	41,000	27
1,1-Dichloroethane	00075-34-3	0 9	540 3	407E-6	3.565	C	190,000	500
1,2-Dichloroethane	00107-06-2	0 9	0.9	678E-9	0 006	B	950	0.039
1,1-Dichloroethene	00075-35-4	0 9	0.9	678E-9	0 006	A	2,000	0 02
t-1,2-Dichloroethene	00156-59-2	0 9	0 9	678E-9	0 006	B	-	360
c-1,2-Dichloroethene	00156-60-5	0 9	9 7	7E-6	0.064	B	190,000	1900
1,1,1-Trichloroethane	00071-66-6	1.0	1847.5	1E-3	12 192	C	450,000	1000
Benzene	00074-43-2	0.7	0.7	527E-9	0.005	A	30	0 12
Trichloroethene	00079-01-6	1.0	9 3	7E-6	0 061	B	33,000	0.45
Toluene	00108-88-3	0.8	205.3	155E-6	1.354	C	89,000	2000
1,1,2-Trichlorothane	00079-01-6	1.0	1.0	753E-9	0 007	B	13,000	0 06
Tetrachloroethene	00127-18-4	1.0	379.3	286E-6	2.503	B	81,000	0.075
Ethylbenzene	00100-41-4	1 0	7 0	5E-6	0 046	B	100,000	1000
Dichlorobenzene	00095-82-9, 00541-73-1	3 0	3.0	2E-6	0.020	B	30,000	200
m/p-Xylene	01330-20-7	1 0	161.0	121E-6	1 062	B	100,000	700
o-Xylene	00095-47-6	1 0	201 5	152E-6	1 330	B	100,000	300
Trimethylbenzene	25551-13-7	2.0	397 8	300E-6	2 625	B	29,000	290

Offgas concentration is the average measured concentration for the period of 05/02/96 to 09/24/96.
Non-detections are presented as equal to the method detection limit An average offgas concentration equal to the MDL indicates that the chemical was not detected in 1996 and that application of the results are conservative
SVE/AS system discharge rate is 200 CFM. Annual hours of operation is 8760.

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TABLE 2
COMPARISON OF ESTIMATED OFFGAS EMISSIONS WITH NYSDEC GUIDELINES
AIR SPARGING/SOIL VAPOR EXTRACTION PILOT STUDY
NWIRP CALVERTON, NEW YORK

	Annual Evaluation			Short-term Evaluation			
Parameter	Estimated Offgas Loading Qa (lb/yr)	Calculated Air Conc. Ca (ug/m^3)*	NYSDEC ACG (ug/m^3)	Estimated Offgas Loading Qh (lb/hr)	Calculated Air Conc. Potent. Cp (ug/m^3)*	Calculated Air Conc. Potent. Max Csp (ug/m^3)	NYSDEC SCG (ug/m^3)
Vinyl Chloride	0.004	5 34E-05	0.2	450E-9	5.33E-05	3.47E-03	1300
Chloroethane	0.134	1 81E-03	63000	15E-6	1.80E-03	1.17E-01	630000
Chloromethane	0.004	5 34E-05	770	452E-9	5 33E-05	3 47E-03	22000
Acetone	0.013	1 78E-04	14000	2E-6	1.78E-04	1.16E-02	140000
2-Butanone	0.013	1.78E-04	300	2E-6	1 78E-04	1.16E-02	140000
Carbon Disulfide	0 013	1.78E-04	7	2E-6	1 78E-04	1.16E-02	710
Methylene Chloride	0.029	3 94E-04	27	3E-6	3 93E-04	2.56E-02	41000
1,1-Dichloroethane	3.565	4.81E-02	500	407E-6	4.80E-02	3.12E+02	190000
1,2-Dichloroethane	0 006	8 01E-05	0 039	678E-9	8.00E-05	5.20E-03	950
1,1-Dichloroethene	0.006	8.01E-05	0 02	678E-9	8.00E-05	5.20E-03	2000
t-1,2-Dichloroethene	0.006	8.01E-05	360	678E-9	8.00E-05	5 20E-03	-
c-1,2-Dichloroethene	0 064	8 61E-04	1900	7E-6	8 60E-04	5.59E-02	190000
1,1,1-Trichloroethane	12.192	1 64E-01	1000	1E-3	1 64E-01	1.07E+03	450000
Benzene	0 005	6 23E-05	0 2	527E-9	6 22E-05	4.04E-03	30
Trichloroethene	0 061	8 23E-04	0 45	7E-6	8 22E-04	5 34E-02	33000
Toluene	1.354	1 83E-02	2000	155E-6	1 82E-02	1.19E+00	89000
1,1,2-Trichlorothane	0 007	8.90E-05	0 06	753E-9	8.89E-05	5.78E-03	13000
Tetrachloroethene	2.503	3 37E-02	0 075	286E-6	3 37E-02	2.19E+02	81000
Ethylbenzene	0.046	6.23E-04	1000	5E-6	6.22E-04	4.04E-02	100000
Dichlorobenzene	0 020	2 67E-04	200	2E-6	2.67E-04	1.73E-02	30000
m/p-Xylene	1.062	1.43E-02	700	121E-6	1.43E-02	9 30E-01	100000
o-Xylene	1 330	1.79E-02	300	152E-6	1 79E-02	1.16E+00	100000
Trimethylbenzene	2.625	3 54E-02	290	300E-6	3.53E-02	2.30E+00	29000

* A 0 4 factor has been applied, as indicated in Step III A 4.

Determine the need for air pollution controls through the use of NYS Air Guide -1
Using the draft 1991 edition, with revised Appendix B (09/13/96).

A. Determine if Building Cavity Impacts are a concern

Step II.A.1 - Define horizontal extent of cavity.
There are no adjacent buildings, therefore set the Building Height Hb equal to the blower height, which equals 3 feet.
The distance to the property line is 500 feet.
Horizontal extent of cavity is 3*Hb = 9 feet, which is less than 500 feet.
Conclusion: no offsite cavity effects.

Step II.A.2 - Define building cavity height
Hc = 1.5*Hb.
Hc = 1.5 • 3 feet = 4.5 feet.
Stack height is 10 feet, which is greater than Hc.
Conclusion: no cavity impacts occur onsite.

B. Determine Maximum Onsite Concentrations and Compare with NYSDEC Guildlines

Step III - Point Source and Area impact.
Use Method III.A-Standard Point Source Method.

Step III.A.1.a.
Air is dicharged horizontally and at ambient temperature.
Conclusion, allow for no plume rise.

Step III.A.2
Calculate the Maxium Actual Annual Impact, Ca.
Ca = 6.0*Qa/He^2.25
Qa Loading (in lb/yr) are presented in Table 1 and the stack height - He equals 10 feet. Calculated values of Ca are presented below, See Table 2. Note that the results presented also include a factor as described in Step III.A.4.

Step III.A.3
Calculate the Maximum Potential Annual Impact, Cp
Cp = 52500*Q/He^2.25
Qa values are presented in Table 1 and the stack height - He is10 feet.
Calculated values of Cp are presented in Table 2. . Note that the results presented also include a factor as described in Step IIIA.4.

Step III.A.4
Since stack height is greater than 2.5 times blower height, then a 0.4 factor can be applied to Ca and Cp values.

Step III.A.5
Calculate maximum Short-Term Impact, Cst
Cst = Cp*65